THE OFFICE OF REGULATORY STAFF

SURREBUTTAL TESTIMONY

OF

DR. DOUGLAS H. CARLISLE

MARCH 26, 2018

DOCKET NO. 2017-292-WS

Application of Carolina Water Service, Incorporated for Approval of an Increase in Its Rates for Water and Sewer Services

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DR. DOUGLAS H. CARLISLE

ON BEHALF OF

THE SOUTH CAROLINA OFFICE OF REGULATORY STAFF

DOCKET NO. 2017-292-WS

IN RE: APPLICATION OF CAROLINA WATER SERVICE, INCORPORATED FOR APPROVAL OF AN INCREASE IN ITS RATES FOR WATER AND SEWER SERVICES

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND OCCUPATION.

A. My name is Douglas H. Carlisle. My business address is 1401 Main Street, Suite 900, Columbia, South Carolina 29201. I am employed by the State of South Carolina as an Economist for the Office of Regulatory Staff ("ORS").

Q. ARE YOU THE SAME DOUGLAS H. CARLISLE WHO PREVIOUSLY SUBMITTED PREPARED DIRECT TESTIMONY IN THIS PROCEEDING?

A. Yes**,** I am.

Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY IN THIS PROCEEDING?

A. The purpose of my Surrebuttal testimony is to respond to the Rebuttal Testimony of Carolina Water Service, Inc. ("CWS") witness, Dylan D'Ascendis.

Q. PROVIDE AN OVERVIEW OF WITNESS D'ASCENDIS' REBUTTAL TESTIMONY.

A. Company witness D'Ascendis asserts in his rebuttal testimony that investors have the following traits:

1. They have complete faith in analysts' predictions and do not care if analysts' predictions are correct. (See D'Ascendis Rebuttal, pp. 4-7.)
2. They believe only Earnings per Share ("EPS") predictions are reliable indicators of growth. (See D'Ascendis Rebuttal, pp. 7-8.)
3. They believe that small companies bring higher returns, but they invest more heavily in larger companies. (See D'Ascendis Rebuttal, pp. 7-8, 14-15.)
4. They believe they must invest more money every year. (This belief is inherent in the use of the Arithmentic Mean as discussed in D'Ascendis Rebuttal, pp. 8-9.)
5. They are relatively indifferent between losing all their money on a given investment and gaining on that investment in a given year. (This belief is inherent in the use of the Small Company Premium as discussed in D'Ascendis Rebuttal, pp. 10, 14-15.)
6. They believe that the past growth of a company is completely irrelevant to its future performance. (See D'Ascendis Rebuttal, pp.5-7, especially p.6.)
7. They generalize from the whole market's behavior to individual companies' expected return. (See discussions of both ECAP-M and the Small Company Premium, pp. 10-11 and pp. 10, 14-15, respectively.)

Additionally, witness D'Ascendis asserts the rate payers of CWS should pay for the fee of 0.02% (0.0002) added to the Debt Rate of 6.58% that allowed its parent company to undertake Long-Term Debt which consolidated all its Debt into one tranche, with a

make-whole provision and an interest-only period of ten (10) years, which was completed at the end of 2017.

Q. WHAT DO YOU CONCLUDE ABOUT THESE CHARACTERISTICS OF INVESTORS AND THIS DEBT FEE?

A. I disagree with the characteristics and the additional debt fee assertions.

Q. DISCUSS WHY INVESTORS MIGHT HAVE DOUBTS ABOUT ANALYSTS' ACCURACY.

A. It is my opinion that stock analysts, collectively, tend to produce overly optimistic estimates. Three (3) analysts for McKinsey & Company, a global management consulting company, reviewed 25 years of data comparing stock analysts' estimates and the performance of Standard & Poor's ("S&P") 500 companies. In their 2010 article, "Equity Analysts: Still Too Bullish," they stated:

> No executive would dispute that analysts' forecasts serve as an important benchmark of the current and future health of companies. To better understand their accuracy, we undertook research nearly a decade ago that produced sobering results. Analysts, we found, were typically overoptimistic, slow to revise their forecasts to reflect new economic conditions, and prone to make increasingly inaccurate forecasts when economic growth declined.
>
> Alas, a recently completed update of our work only reinforces this view — despite a series of rules and regulations, dating to the last decade, that were intended to improve the quality of the analysts' long-term earnings forecasts, restore investor confidence in them, and prevent conflicts of interest.[1]

Dr. Mark Bradshaw of Boston College and three (3) colleagues from other universities performed a thorough review of analysts' accuracy compared to projections

[1]Marc Goedhart, Rishi Raj and Abhishek Saxena, "Equity Analysts: Still too Bullish," in McKinsey Quarterly, April 2010, accessed through on-line version https://www.mckinseyquarterly.com.

based upon time-series data. The study demonstrated that, at best, analysts are superior only with respect to large firms, and then only for short periods of time. This exhaustive study reviews previous historical research going back several decades, uses tens of thousands of data points, and indicates that previous research either overstated analysts' abilities or never claimed that they were completely superior to time-series data.[2] Some studies go even further and claim that, for certain periods, the results run directly counter to analysts' recommendations. For example, Dr. William E. Baker of San Diego State University and his colleague, Mario Ramos, found stocks with Buy ratings that they studied for the period 1998-2005 underperformed those with Hold and Sell ratings.[3]

There are several other studies that indicate analysts are far from perfect; however, witness D'Ascendis contends that investors are indifferent to whether analysts are right, for he states that, "…it does not really matter what the level of accuracy of those analysts' forecasts is well after the fact. What is important is that they reflect widely held expectations influencing investors at the time they make their pricing decisions and hence the market prices they pay." [D'Ascendis rebuttal, p.5, lines 24-27] Further, witness. D'Ascendis states that analysts' accuracy is unknowable because, "Investors have no prior knowledge of the accuracy of any forecasts available at the time they make their investment decisions, as that accuracy only becomes known after some future period of time has elapsed." [D'Ascendis rebuttal, p.6, lines 21-23] Thus, according to witness D'Ascendis, investors do not care if analysts have made errors in the past, even in the very recent past.

[2]https://care-mendoza.nd.edu/assets/152184/bradshaw.pdf
https://care-mendoza.nd.edu/assets/152185/bradshawpaper.pdf
[3]Roger K. Loh and G. Mujtaba Mian, "Do accurate earnings forecasts facilitate superior investment recommendations?" Journal of Financial Economics, Volume 80, Issue 2, May 2006, Pages 455-483.

He would have us believe that investors have total faith in analysts' predictions, despite prefacing the sentence previously quoted with, "Investors are also aware of the accuracy of past forecasts, whether for EPS or DPS growth, or for interest rate levels." [D'Ascendis rebuttal, p.6, lines 20-21]

Q. DO YOU INCLUDE ANALYSTS' PREDICTIONS IN YOUR ANALYSIS?

A. Yes. I use Value Line estimates for four (4) measures of growth. Indeed, half of my Discounted Cash Flow ("DCF") result for growth is based upon these estimates.

Q. DOES COMPANY WITNESS D'ASCENDIS USE HISTORICAL DATA IN HIS ANALYSIS?

A. Yes. Company witness D'Ascendis uses historical data which is a contradiction to his assertion that only analysts' estimates should be used. Witness D'Ascendis' CAP-M and especially, the PRPM, are based upon a large amount of historical data.

Q. PLEASE DISCUSS WHY EPS SHOULD NOT BE THE SOLE FACTOR IN A DCF ANALYSIS.

A. EPS should not be the sole factor in a DCF analysis because earnings begin with sales and the disposition of earnings involves paying dividends and retaining earnings, which increases book value. Because dividend payments are the basis for the DCF model, to ignore dividend payments is to ignore the fundamental assumption of the DCF Model. Witness D'Ascendis seems to rely upon a quotation from Jeremy Siegel to insist upon the exclusive use of EPS: "It is earnings per share (EPS) that is important to Wall Street because per-share data, not aggregate earnings or dividends are the basis of investor returns." [D'Ascendis rebuttal p. 6, lines 16-18.]. I use per-share data for three (3) of my

four (4) indicators of growth and I use the change in sales for the fourth. In the long run, without growing sales, there is no growth in EPS. Moreover, EPS growth may falter and Dividends per Share ("DPS") growth and Book Value per Share ("BVPS") may temporarily surpass it. The main purpose I have in including all these measures is to smooth out temporary variations. In effect, my use of indicators of growth other than EPS serves to indicate better what long-term EPS growth will be.

Q. DOES WITNESS D'ASCENDIS INCORPORATE DATA OTHER THAN EPS IN HIS ANALYSES?

A. Yes. Witness D'Ascendis incorporates total returns on investments in both his CAP-M and his PRPM. Total returns result from the appreciation of stock prices and from dividend yield. Without growth in DPS, dividend yield cannot keep up with increases in stock price.

Q. WHAT IS THE MAIN DIFFERENCE BETWEEN YOUR ANALYSIS AND WITNESS D'ASCENDIS'S ANALYSIS RELATED TO MARKET RETURN?

A. Witness D'Ascendis asserts my analysis should have incorporated returns weighted by the market capitalization of firms. This contradicts his assertion that investors expect a small company premium. Furthermore, the incorporation of returns weighted by market capitalization would violate the construct of deciles in the first place, even if they are not true deciles. "The 'Market'" figure of 9.8% referenced by witness D'Ascendis [D'Ascendis rebuttal p. 8, line 1] is very close to the capitalization-weighted average geometric annual return in Stocks, Bonds, Bills, and Inflation ("SBBI") and effectively disregards both the construct of having capitalization breaks and emphasizing small

companies. Investors, as I noted in my Direct Testimony, "invest in discrete companies, not in capitalizations," but using capitalization weighting or the 9.8% figure disregards this fact. If investors truly believed that there was a Small Company Premium, it is difficult to believe that an emphasis on larger companies would better reflect their preferences.

Q. WHAT IS YOUR RESPONSE TO WITNESS D'ASCENDIS'S ASSERTION THAT YOU ERRED IN USING THE GEOMETRIC MEAN?

A. Compounding is one of the most powerful considerations in finance and investment. The geometric mean or Compound Annual Growth Rate ("CAGR") recognizes this fact, but the simple annual average or arithmetic mean ignores compounding and can even mislead investors. Every year or period involves a change, which results in a new starting point, sometimes called the "base" or "basis" for the next year's calculation of return. The geometric mean or CAGR recognizes this fact, but the arithmetic mean does not. In essence, the simple average combines the average change starting from different bases and treats them as though they started from the same base. Investors care whether they are getting a 10% increase in $100 versus a 10% increase in $1,000. The example below demonstrates that the simple/arithmetic annual average does not reflect the changing base:

Table 1: Example of the Impact of Arithmetic Mean v. Geometric Mean

Starting amount:	$100	
% change	*75%	(*1.75)
Ending amount, year 1:	$175	
% change	100%	(*2.00)
Ending amount, year 2	$350	
% change	-100%	*(0.00)
Ending amount, year 3	$0	

Average change = (75% + 100% - 100%) / 3 = 25%

BUT applying this average does not give us the actual result:

Starting amount:	$100	
% change	*125%	*(1.25)
Ending amount, year 1:	$125	
% change	*125%	*(1.25)
Ending amount, year 2	$156	
% change	*125%	*(1.25)
Ending amount, year 3	$195	

This example illustrates how misleading the arithmetic mean of annual average changes can be and the possibility that investors can lose all their money. Certainly, in the example above, an investor who expected to have $195 would be disappointed to discover that the actual return was zero and all the original investment was gone, so there was no return of the starting investment. In fact, unless the percentage change is the same every year, the simple average will always be larger than the geometric mean. Over long periods of time, as an investment grows through compounding, the chances grow ever larger that higher percentage returns on lower starting amounts will be averaged in with lower percentage returns on higher amounts.

Thus, for a long period of data, the CAGR or geometric mean is appropriate, whereas the arithmetic mean inflates returns. Investment advisors are aware that CAGR

is superior. Consider this quotation from advice from Buckingham Advisors entitled "The Perils of Owning Individual Stocks":

> While more than 71% of individual stocks have a positive arithmetic average return over their full life, only a minority (49.2%) of common stocks have a positive lifetime holding-period return, and the median lifetime return is -3.7%. This is because of volatility and the difference in arithmetic (annual average) returns versus geometric (compound or annualized) returns. For example, if a stock loses 50% in the first year and then gains 60% in the second, it has a positive arithmetic return but has actually lost money (20%) and has a negative geometric return.[4]

Although witness D'Ascendis quotes SBBI in his rebuttal, the quotation referenced in his rebuttal treats the "expected," rather than the current Equity Risk Premium ("ERP") in order to support the arithmetic mean. An earlier version of the book, on page 59 of the 1982 Edition of SBBI stated:

> The arithmetic mean historical return on a component is used in making one-year forecasts, since the arithmetic mean accurately represents the average performance over a one-year period. Over a long forecast period, however, the geometric mean historical return represents average performance over the whole period (stated on an annual basis). Therefore, we input the arithmetic mean for a one year forecast, the geometric mean for the twenty year forecast and intermediate values for two, three, four, five and ten year forecasts.

Dr. Aswath Damodaran, an expert in finance at New York University, addresses this issue quite forcefully. While acknowledging some analysts and academics argue for the arithmetic mean, he reasons:

> …There are, however, strong arguments that can be made for the use of geometric averages. First, empirical studies seem to indicate that returns on stocks are negatively correlated over time. Consequently, the arithmetic average return is likely to over state the premium. Second, while

[4] Downloaded 02/28/2018 from http://buckinghamadvisor.com/the-perils-of-owning-individual-stocks/

> asset pricing models may be single period models, the use of these models to get expected returns over long periods (such as five or ten years) suggests that the estimation period may be much longer than a year. In this context, the argument for geometric average premiums becomes stronger. Indro and Lee (1997) compare arithmetic and geometric premiums, find them both wanting, and argue for a weighted average, with the weight on the geometric premium increasing with the time horizon.
>
> In closing, the averaging approach used clearly matters. Arithmetic averages will be [sic] yield higher risk premiums than geometric averages, but using these arithmetic average premiums to obtain discount rates, which are then compounded over time, seems internally inconsistent. In corporate finance and valuation, at least, the argument for using geometric average premiums as estimates is strong.[5]

Q. WHAT INVESTOR BEHAVIOR WOULD SUPPORT USING AN ARITHMETIC MEAN?

A. If investors steadily invested both every year or period and only at the end of each quarter or year, then it might make some sense to use the arithmetic mean. The CAP-M, however, uses longer-term data and there are virtually no investors who have steadily invested for eight decades and rebalanced their portfolios every quarter during that period. The data that witness D'Ascendis and I use covers a long period of time, so it does not make sense to use the arithmetic mean. Moreover, the disappearance of companies, especially for reasons of bankruptcy, from the database most commonly used to compute the CAP-M already overstates returns somewhat. This overstatement is called "Survivorship Bias."

[5] Aswath Damodoran, Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2011 Edition, pp. 23-24 accessed at: www.stern.nyu.edu/~adamodar/pdfiles/papers/ERP2011.pdf

Q. EXPLAIN HOW SURVIVORSHIP BIAS INTERACTS WITH THE LONG-TERM BEHAVIOR OF STOCKS SO AS TO MAKE USING THE ECAP-M INAPPROPRIATE.

A. A great deal has been made of small companies' bringing higher returns than expected by predictions based upon β. Survivorship Bias is the most plausible explanation for this unexpected result, although another explanation may be that the time horizon used is too short. Like volatility as a predictor of returns, the ECAP-M suffers from what may be called the "Level of Analysis" problem: the tendency to impose market wide trends upon individual stocks. Thus, although small companies as a class may bring more return, many members of that class may bring a low return precisely because their risk has led to loss or dramatic failure.

In any event, there is already a compensation for small companies built into many βs provided by commercial services. Value Line's βs, the ones I use, provide for companies' regressing to the mean – that is, tending to turn back toward the overall market after deviating from it. The effect of this adjustment is to adjust lower βs toward that overall market return. By raising the raw β of low-β stocks, adjustments such as Value Line's in effect raise their predicted return. To make a larger or further adjustment is to double count risk. As for small companies with high βs, although collectively they may outpace the market, this is logically explainable by Survivorship Bias, which I have already discussed.

Q. DOES β MEASURE ALL RISKS AND IS WITNESS D'ASCENDIS CORRECT IN HIS CRITICISM OF YOUR COMPARABLE EARNINGS MODEL ("CEM") ANALYSIS?

A. No. β measures systematic, non-diversifiable risk. Under portfolio theory, all other risks are diversifiable, so companies do not have to compensate investors for risk and the market will not compensate for risk. CAP-M is based upon the concept of portfolios, so an investor can neutralize the risks particular to a company, or "non-systematic risk," by investing in other companies with different risks. Similarly, my CEM analysis uses large numbers of companies, so risk is diversified and attempts to introduce other adjustments is unnecessary and inaccurate.

Q. IS YOUR CEM METHOD NOT MARKET BASED AND IN CONFLICT WITH YOUR OTHER ANALYSES?

A. No. Witness D'Ascendis states that "book value by itself is not a valid measure of the investor required return." Contrary to that assertion, The Cost of Capital – A Practitioner's Guide prepared for the Society of Utility and Regulatory Financial Analysts, however, is quite clear:

> The comparable earnings method is designed to measure the returns expected to be earned on the original book value of similar risk enterprises. Thus, this method provides a direct measure of the fair return, since it translates into practice the competitive principle upon which regulation rests.
>
> The comparable earnings method normally examines the experienced and/or projected returns on book common equity. The logic for returns on book equity follows from the use of original cost rate base regulation for public utilities, which uses a utility's book common equity to determine the cost of capital. The cost of capital is, in turn, used as the fair rate of return which is then applied (multiplied) to the book value of rate

base to establish the dollar level of capital costs to be recovered by the utility.[6]

Most ROE witnesses do not literally look at actual returns to stock holders in the form of the stocks they sell at given prices, nor do they look just at retained earnings and equity flotations for increased corporate value. The only figure that is actual money in the stockholder's pocket is dividends, until the stock is sold. Most remaining analyses use proxies. Witness D'Ascendis commends EPS gains but that is not a gain to a stockholder unless the EPS gains translate into stock price gains that the stockholder realizes by selling stock. I use growth in book value as a proxy for growth in fair market returns. Over time, circumstances may change the relationship between book value and market value, but the same could be said for EPS.

Q. WHY DID YOU NOT USE THE BOOK VALUE PER SHARE FROM YOUR DCF CALCULATION FOR THE CEM ANALYSIS?

A. First, the BVPS data used in my DCF analysis is that of companies composed of regulated utilities, whereas, as is common practice, I use non-utilities in my CEM. Second, the purpose of using non-regulated companies for a CEM analysis is to take companies with entirely different business profiles, such as productivity, and adjust them so that they are comparable to regulated utilities. One would not expect a non-utility to yield the same return from investments as a utility. Following the Great Recession, however, manufacturing non-utilities whose stocks varied with the market in a manner comparable to how water utility stock varied suffered an outright decline in Net Equity, as shown on

[6] David C. Parcell, The Cost of Capital – A Practitioner's Guide, prepared for the Society of Utility and Regulatory Financial Analysts, 2010 Edition, pp.115-116.

Exhibit DHC-12, pp. 3-4. These firms are still recovering, thus their productivity is too. Although the comparison is not perfect, it is far from "apples and oranges," as witness D'Ascendis indicates. On the other hand, witness D'Ascendis' Proxy Group of Twenty-Eight Non- Price Regulated Companies (see Exhibit DWD-6, p. 3 of 3) reflects an average Value Line β of 0.80 – well above water companies' median β of 0.75 – as well as adding an analysis based upon the false assumption that companies' returns compensate investors for risks that they can neutralize with a diversified portfolio.

Q. PLEASE DISCUSS THE CONTRAST WITNESS D'ASCENDIS DRAWS BETWEEN YOUR ROE RESULTS AND HIS "CORRECTED RESULT" ON PAGE 14 OF HIS REBUTTAL.

A. I strongly disagree with witness D'Ascendis "corrected result." The following table, from Standard & Poor's, indicates in its "Annualized Total Returns" column why his results and critique should not be followed.

Table 2: S&P 500 SECTOR RETURNS, RANGE: 2/28/2018 -- 10/9/2001

Sector	ANNUALIZED STOCK RETURN	ANNUALIZED TOTAL RETURN	% DIVIDENDS INCREASED RETURN	STOCK RETURN	TOTAL RETURN
Energy	5.24%	7.65%	45.85%	131.01%	234.46%
Materials	7.21%	9.65%	33.79%	213.08%	352.50%
Industrials	6.42%	8.78%	36.76%	177.34%	297.35%
Consumer Discretionary	8.86%	10.39%	17.25%	301.96%	405.14%
Consumer Staples	5.90%	8.67%	47.07%	155.79%	290.91%
Health Care	5.82%	7.74%	33.03%	152.62%	239.28%
Financials (incl RE pre-9/19/16)	2.42%	4.68%	93.62%	47.92%	111.64%
Information Technology	9.17%	10.31%	12.36%	321.27%	398.99%
Telecom. Services	-1.20%	3.24%	370.28%	-17.92%	68.56%
Utilities	2.66%	6.73%	153.19%	53.73%	190.87%
Real Estate	3.86%	8.21%	112.82%	85.98%	264.51%
S&P 500	**5.92%**	**8.08%**	**36.40%**	**156.81%**	**257.30%**

Source: https://us.spindices.com/indices/equity/sp-500 (under "Additional Information" dropdown as "S&P Market Attributes Web File")

As this table shows, the S&P 500 has not produced returns approaching those that witness D'Ascendis believes I should have recommended. Moreover, this sort of return is not confined to stocks with large capitalizations. Buckingham Advisors' web article states "Just 37.4% of small stocks have holding period returns that exceed those of the one-month Treasury bill."[7] In other words, 62.6% of small stocks have negative ERP's.

My results fall within the zone of reasonableness indicated by actual total returns. I again commend to the Commission my ROE of 9.08%.

Q. DOES THIS CONCLUDE YOUR SURREBUTTAL TESTIMONY?

A. Yes.

[7] Downloaded 02/28/2018 from http://buckinghamadvisor.com/the-perils-of-owning-individual-stocks/